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ABSTRACT

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Behavioral Definers of Reading Achievement

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Abstract

This paper develops a rationale for a three dimensional model of nonintellectual behavior of children and supports the rationale with a review of relevant theoretical and empirical work. The tenability of the model and its relationship to early reading achievement is then explored. Dimensions derived from a cluster analysis of the Pupil Behavior Rating Scale support the conceptual model by defining an adaptation, and interpersonal and intrapersonal dimension. The relationship of each of the dimensions to reading achievement of children when they are in first and second grade showed that the adaptation dimension was a crucial contributor to reading achievement level. Furthermore, the significant unique contribution of this dimension to reading achievement when the effects of sex, socio-economic level, ethnic status and cognitive functioning were controlled indicates that further exploration of levels of adaptation in children needs to be explored as prerequisites to success in early reading programs.

Behavioral Definers of Reading Achievement

The increased interest and concern over the academic achievement of public school children, especially in the primary school years, necessitates a careful examination of potentially relevant factors contributing to early success in reading. Traditionally measures of cognitive functioning, sex and socio-economic status have been shown to share a significant amount of variance with the reading achievement scores of young children. Although reliable and valid, such measures provide static indicators of subsequent reading achievement, and do not provide insights into those attributes which, if modified, or taken into consideration could lead to greater reading proficiency. Both cognitive and affective learning components are thought to be important factors in the beginning reading process. But the preponderance of empirical evidence clearly has focused on establishing a causative relationship between level of cognitive functioning and reading success. On the other hand, the long standing interest in the study of affective functioning (emotional state, feelings, personality and adaptive functioning) has not centered on the relationship of these behavioral characteristics to reading achievement, but on the use of these measures as mental health indicators. While level of cognitive functioning is considered to be causally related to early reading, affective status is often judged to be the effect rather than the cause of early reading failure, since the child's failure to cope in school (i.e. learn to read) affects his psychological well-being.

Our extensive work at Berkeley (Lambert, 1972; Lambert and Hartsough,

1973; Lambert, 1976; Lambert, Hartsough and Zimmerman, 1976 and; Lambert and Urbanski, 1976) provides a substantial body of evidence from which to propose a three-dimensional model of non-intellectual behaviors of school-age children--that is, three relatively independent aspects of the affective life of children which may be distinguished. In this model, the dimensions defined are (1) behaviors reflecting adaptation to school, (2) individual differences in emotional states and (3) individual differences in interpersonal behavior. This conceptual scheme additionally permits hypotheses about which non-intellectual characteristics may affect early reading success and the differentiation of these dimensions from the others reflecting mental health or school adjustment status. The spate of studies of the affective or non-intellectual behavior of school age children has not generally sought to develop a model with which to differentiate learning-related from mental health-related behavior.

We have available, however, a substantial body of theory and empirical evidence to support our proposition that behaviors reflecting adaptation to the classroom, behaviors reflecting individual differences in interpersonal style or social interactions, and affective, intrapersonal behaviors can be reliably assessed, and that they are valid predictors of concurrent educational and mental health status. Accompanying evidence of concurrent validity, we now have available findings from long term prediction studies using a variety of outcome measures such as later referral of children because of learning and behavior problems (Pimm and McClure, 1967) subsequent school achievement (Kohn & Rosman, 1974), school progress (Kellam, Branch & Agrawal, 1975) and adolescent educational and adjustment status (Lambert, 1972).

Hewett has provided important theoretical formulation regarding the learning related behaviors which we have conceptualized as belonging to the adaptation dimension in the model (Hewett, 1965). His developmental learning model defined a hierarchy of behaviors related to ultimate mastery of academic skills. In this system, he attempted to separate the learning-related behaviors of educationally handicapped children from those associated with their emotional or personality disorders. He postulated that by determining whether children had acquired appropriate attention and response behaviors, the ability to follow directions and procedures in learning tasks, the ability to work independently of the teacher, and the ability to explore the classroom environment freely and appropriately, one would be able to provide curriculum materials that were not only at an appropriate skill level, but also consistent with the child's behavioral functioning in the classroom. Hewett's earlier and later work (1965, 1968, 1974), made a convincing argument for assessing not only the cognitive and perceptual functioning of exceptional children, but also their classroom adaptational characteristics.

Two other attempts to define behaviors related to early school success approached the problem by asking teachers to specify those school behaviors which they considered to be crucial for early success in school.

Kellam and Schiff (1967) asked teachers to provide lists of the ways children have difficulty in adapting to the classroom. They sorted the pool of statements into five general categories: social contact, authority-acceptance, maturation, cognitive-achievement and concentration, and validated a subsequent rating procedure by observations of naive observers. Kellam and co-workers later proposed a two-dimensional system of child mental health with one dimension being defined as social adaptational status (based on ratings of teachers) and the other as psychological

well being (based on self-reports and clinical interviews) (Kellam, Branch and Agrawal, 1975). They found that ratings of children's social adaptational status in first grade were significantly related to later need for remedial help and school retentions in the intervening elementary years. Even when intelligence test scores and school achievement were included in a prediction battery, the measures of social adaptational status made a significant independent contribution to these outcomes.

Anderson (1967) collected over 6500 "readiness" incidents from first grade teachers and classified and talled them as intellectual (60%) and non-intellectual (40%). Among the classifications of non-intellectual incidents were those described as attitudes toward school and school work, conformity to classroom procedures, personal emotional development, peer relationships, motor coordination and physican condition. From these data Anderson proposed a three dimensional domain of readiness, including cognitive-intellectual, social-personal and sensory-motor behavioral assessments.

The judgements of elementary school teachers reported by Kellam and co-workers, the work of Anderson and the developmental learning model of Hewett taken together provide a pragmatic and theoretical basis to support the proposed conceptual model of non-intellectual behavior of children. Even though the original objectives for the development of many behavior rating scales were not to verify such a conceptual model, the empirical evidence from several factor analytic studies demonstrates the validity of the proposition that school behavioral characteristics in the affective domain can be defined as classroom adaptational status, interpersonal (aggressive, acting out) and intrapersonal behaviors (withdrawing, shy). (Kim, Anderson and Bushaw, 1968; Ross, Lacey and Parton, 1965; Kohn and Rosman, 1973; Conners, 1969; Nihira, 1969).

Even though Spivak and Swift's (1973) review of rating scales points out that mental health or clinical criteria are the most common criteria used in appraising the validity of behavioral ratings, there are several studies which demonstrate the relationship of the postulated non-intellectual dimensions to achievement. Lambert (1972) and Lambert, Hartsough and Zimmerman (1976) demonstrated the validity of non-intellectual characteristics for predicting school achievement as measured by both teacher-assigned grades and achievement test scores. In addition the latter study showed that affective behavioral attributes measured in second and fifth grade were as good, and in some cases better, predictors of ninth and twelfth grade scholarship than were intelligence and achievement test scores in elementary school.

A revision of the behavioral rating used in the studies by Lambert and her colleagues provided interval (rather than Likert-type) scales for 11 attributes designed to assess this conceptual model of affective characteristics. The development and validation of this scale is reported in Lambert and Hartsough's 1972 papers, and Hartsough (1973) has presented a detailed analysis of the underlying dimensionality of the scale. She reported that the three dimensions of adaptation, interpersonal (aggressive, acting out) and intrapersonal (withdrawn, shy) dimensions characterized the affective behavior of elementary school children. The Pupil Behavior Rating Scale (Lambert, 1970) provides anchored measures on descriptive scales which are reliable (attribute reliabilities vary from .697 to .995) assessments of these individual differences and which can be employed in an investigation of non-intellectual correlates of early reading achievement.

Objectives

The objective of my report is to provide evidence on the validity of

the conceptual model and to determine the unique contributions of assessments of non-intellectual (affective) behavior to reading achievement.

Origins of the Data

The data which I will report in this discussion come from two investigations: (1) a study of the relationship of these affective attributes and their behavioral dimensions to first and second grade reading achievement and (2) a study of the behavior profiles which are associated with reading success based on the performance of a large number of elementary school pupils from first through sixth grades.

(Lambert & Nicoll, in press)

In the first study we had data available from kindergarteners in 17 classrooms in four schools in the San Francisco Bay area. During kindergarten, the children completed the written exercises for the Let's Look at First Graders (Educational Testing Service, 1965) and at the middle of first grade the teacher rated them on the Pupil Behavior Rating Scale. At the end of first and second grade reading tests were available from state-mandated testing program.

In the second study we had data on the Pupil Behavior Rating Scale for over 1000 elementary school pupils and reading test scores administered by the school at the end of the school year.

Results of the Exemplary Studies

Table 1 of this report shows the dimensionality of the Pupil Behavior Rating Scale for children in first grade. Hartsough (1973) showed that these dimensions and their definers were common to children of different ages, to males and females and to children of different ethnic groups. Table 2 displays the zero order correlations of demographic data, the cognitive measures, the attributes, the three attribute dimensions of adapta-

tion, interpersonal (aggressive, acting out) and intrapersonal (unhappy, withdrawn), with reading test scores at the end of first and at the end of second grade. Simply comparing the correlations of the cognitive measures with reading achievement and those of the behavioral attributes with achievement illustrates the important contribution of these affective characteristics and scholastic success.

The next step was to determine the unique contribution of demographic factors, cognitive variables, and the attribute dimensions with reading achievement. Tables 3 and 4 provide the results of these analyses. As one can ascertain, the variables with the highest correlations with reading achievement were, in order of magnitude, the adaptation dimension, cognitive functioning and the intrapersonal behavioral dimension. The interpersonal dimension did not improve the size of the multiple R. The adaptation dimension combined with the demographic variables had a higher correlation with reading achievement than did the cognitive functioning variables in combination with the demographic indicators. The power of the prediction was greater from first to second grade than it was from the middle of the first grade (when the teachers completed the ratings) and the end of the first grade (when the achievement tests were administered).

These data make it apparent that the adaptation dimension adds significantly to the prediction of both reading criteria when demographic and cognitive factors are controlled. The intrapersonal dimension also contributed significantly to reading achievement independently of demographic factors and cognitive functioning. These analyses illustrate the powerful relationship of poor classroom adaptation to reading failure, and the weaker, but significant relationship of withdrawn behavior to lack of read-

ing success. From these data we can conclude that in kindergarten and first grade, being an aggressive, acting out pupil, even to a considerable degree, is not uniquely associated with reading achievement when these other factors are controlled.

Turning to the data from an entire elementary school sample, we attempted to determine whether particular behavioral profiles were related to reading achievement. From the first data set, reported on Tables 1-4, it seemed apparent that the behaviors associated with adaptation were most crucial for success in reading. In order to establish behavioral profiles, we employed the BC Try Cluster Analysis (Tryon & Bailey, 1970) program which assigns subjects to O-types of the basis of their factor scores on the behavioral clusters. All subjects are assigned a value of "0" for a dimension if the factor score on that dimension is more than one standard deviation below the mean, a 1 if the score is between +1 and -1 standard deviation from the mean. In these instances, as in the other data reported, the higher the score on the behavioral attributes, the more problems the pupil manifests.

Table 5 lists the O-types defined on the basis of their cluster score patterns and the frequency of each O-type in the sample. In the first column is the value for the adaptation cluster, the second reports the value for the interpersonal cluster and the third, the one on the right, the value for the intrapersonal cluster. Achievement scores are reported as mean percentile ranks for each O-type. We compute complex contrasts for groups of subjects based on their O-types, and found that all subjects with a 0 in the adaptation cluster (cluster 1 on the left) had higher achievement scores than those with a 1 or a 2 in cluster 1. All those with a 1 in

the adaptation cluster had higher test scores than those with a 2 in this cluster. We concluded from this analysis that the behaviors which define the adaptation cluster are the most crucial set of behaviors for reading achievement. Table 5 provides an additional observation worthy of follow-up. Within each set of O-types with the same value for cluster 1 the subjects with the better achievement test scores had higher (more negative) cluster scores in the interpersonal cluster (the value in the middle). Though we attempted to determine whether this was a significant variable within each of these O-type groups, the probability of the relationship was not significant. Nevertheless, exploring further the possibility that withdrawn, unhappy, non-interacting children are more likely to be at a greater disadvantage in achievement of reading competence than are those who are aggressive and acting out in school is worthy of consideration by other investigators interested in this area.

Conclusion

I have hoped to show you that behavioral attributes of children are highly predictive of reading achievement even when demographic and cognitive factors are controlled. Furthermore, in presenting a conceptual model for accounting for differences in affective functioning, and relating the dimensions of this model to reading achievement, my intention was to show that it is possible to identify those behavioral characteristics which are most associated with school success and to isolate those that are associated with individual differences in social-emotional adjustment. From these findings it seems clear that adaptation, (or social adaptation status a la Kellam) and interpersonal and intrapersonal attributes or psychological "well being" can be considered to be two sets of relatively independent affective characteristics of children which have differential relationships to reading achievement.

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Table 1

Factor Structure of School Behavior for
Adaptation, Aggressive and Acting Out Dimensions

Attribute number	Attribute	Orthogonal-Factor Coefficients			Communality	Average Correlation of Attribute With Other Definers
		C_1	C_2	C_3		
Adaptation Dimension Attributes						
9.	Learning	.920	-.125	-.042	.864	.818
2.	Instructions	.906	.004	-.007	.822	.805
4.	Dependency	.830	.019	.031	.691	.737
8.	Enthusiasm	.896	.101	.017	.813	.796
Interpersonal Dimension Attributes						
1.	Fighting	.412	.773	.031	.769	.554
7.	Dangerous	.469	.703	-.012	.715	.523
6.	Distracted	.809	.353	-.060	.783	.397
9.	Learning[a]	.920	-.125	-.042	.864	.139
Intrapersonal Dimension Attributes						
10.	Sick	.525	-.191	.554	.619	.522
5.	Coaxed	.345	-.198	.517	.425	.407
11.	Unhappy	.565	.331	.504	.683	.561
3.	Immature	.680	.373	.287	.684	.523

[a] Reflected

Table 2

Independent Variables as Individual Predictors of First and Second Grade Reading Scores

Item	First Grade n=193	Second Grade n=165
Behavior Attributes		
Difficulty learning	-.597	-.673
Difficulty following instructions	-.524	-.626
Dependent on teacher	-.510	-.516
No enthusiasm	-.567	-.632
Fighting	-.307	-.293
Dangerous Behavior	-.357	-.216
Easily Distracted	-.509	-.499
Sick or upset	-.287	-.355
Needs to be coaxed	-.205	-.300
Unhappy or depressed	-.444	-.358
Immature Responses	-.462	-.457
Adaptation (C)	-.600	-.664
Interpersonal (C_2)	-.253	-.142*
Intrapersonal (C_3)	-.446	-.471
Let's Look At First Graders		
Shapes and Forms	.229	.322
Spatial Relations	.384	.394
Time Concepts	.498	.574
Understanding Mathematics	.549	.500
Communication Skills	.487	.508
Logical Reasoning	.488	.494
Demographic Variables		
Ethnic Status		
Caucasian vs Not Caucasian	.334	.336
Black vs Not Black	-.315	-.352
Oriental vs Not Oriental	.060*	.083*
Sex	-.161*	-.123*
Socioeconomic Status	-.322	-.331

* $p > .01$

Table 3

Multiple Correlations, Proportion of Variances, and Increments Associated With the Three Behavioral Dimension and Cognitive Functioning for First Grade Reading Scores

Battery	R	R^2	Increment Over Control	F	df
Solution A. As Control					
A. Sex, Caucasian, Black Oriental, SES	.390	.152			
B. A. + Adaptation	.672	.452	.300	103.38*	1/186
C. A. + Interpersonal	.424	.180	.028	6.32	1/186
D. A. + Intrapersonal	.580	.336	.184	52.66*	1/186
E. A. + Cognitive Functioning	.650	.423	.271	14.56*	6/186
Solution E. As Control					
F. E. + Adaptation	.734	.539	.116	46.60*	1/180
G. E. + Interpersonal	.661	.437	.014	4.71	1/180
H. E. + Intrapersonal	.698	.487	.064	22.96*	1/180

*$p < .01$

Table 4

Multiple Correlations, Proportion of Variance, and Increments Associated With the Three Behavioral Dimension and Cognitive Functioning for Second Grade Reading Scores

Battery	R	R^2	Increment Over Control	F	df
Solution A. As Control					
A. Sex, Caucasian, Black, Oriental, SES	.391	.153			
B. A. + Adaptation	.722	.521	.368	147.00*	1/186
C. A. + Interpersonal	.403	.162	.009	1.96	1/186
D. A. + Intrapersonal	.596	.356	.203	59.56*	1/186
E. A. + Cognitive Functioning	.662	.438	.285	15.31*	6/181
Solution E. As Control					
F. E. + Adaptation	.764	.584	.146	63.48*	1/180
G. E. + Interpersonal	.666	.444	.006	1.84	1/180
H. E. + Intrapersonal	.713	.509	.071	26.33*	1/180

*$p < .01$

Table 5

Means and Standard Deviations of

Reading Achievement Percentiles by O-Types

O-Type	N	Mean	S.D.
001	88	65.57	27.20
010	141	73.62	25.22
011	69	73.96	25.54
101	61	34.69	26.85
111	102	49.43	28.03
112	71	45.92	32.50
121	54	54.67	29.80
122	57	53.04	28.70
211	59	26.14	21.47
212	49	21.22	23.93
221	50	32.38	22.73
222	30	31.60	23.76

Code for interpreting table:

0 = low cluster score
1 = average cluster score
2 = high cluster score

The above values in the O-type are assigned to cluster scores in this order: